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**Motives for the International Licensing
of Branded Food and Related Products**

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Abstract

Given initial empirical observations of international licensing of food and beer brands, this paper presents a simple game-theoretic model of the motives for licensing. The model suggests that imperfect competition in overseas markets and imperfect information about incumbent firms' payoffs are important determinants of a branded product licensing equilibrium.

Introduction

Casual empiricism suggests that international licensing of the production and marketing of branded food and related products may become an increasingly important aspect of the globalisation of the food industry, particularly in sectors such as soft drinks, brewing and confectionary products. However, much of the recent theoretical literature on licensing has dealt only with the licensing of process technologies, rather than branded products (see Tirole, 1989, for a survey). The purpose of this paper is to consider the possible motives for food manufacturing firms to license their branded products to overseas firms.

Section 1 deals in general with brand licensing in the food processing sector and focusses in some detail on licensing and the brewing industry. Currently major US brewers are both licensees for foreign beers and have recently begun to license their products to foreign firms. Section 2 presents a simple game-theoretic characterisation of a product licensing equilibrium, which takes into account the motives of both the **licensor** and the **licensee**.

1. Branded Food Products and Licensing

As a form of business activity, the licensing of branded food and related products has existed for many years in both the US and other developed countries' food processing sectors. For example, both Coca-Cola and Pepsi-Cola have licensed the domestic canning and distribution of their final products. The activity also crosses national borders. For example, Cadbury-Schweppes and Britvic-Corona own the UK canning and distribution rights to "Coca-Cola" and "Pepsi-Cola" respectively; the chocolate products "Kit-Kat" and "Rolos", both made in the UK by Nestlé-Rowntree, are manufactured under licence in the US by Hershey; "Yoplait" yoghurts are made under licence in the US from the French firm Sodima; and "Knorr" products are licensed by CPC to Ajinomoto in Japan.

Because of recent developments, it is interesting to consider in more detail the case of brewing. Leading US brewers, Anheuser Busch and Miller, are now licensing the production and marketing of their respective products "Budweiser" (US market share-27 per cent) and "Miller Lite" (US market share-10 per cent) to leading UK brewing companies. US brewers also own the rights to produce foreign beers in the US. For example, "Löwenbrau" (German) and "Killian's Red" (Irish) are made under licence by Millers and Coors respectively.

In order to set licensing in context, it is relevant to describe briefly the market structures of the US and UK brewing sectors (see Connor *et al*, 1985 and Monopolies and Mergers Commission, 1989 for discussion of the US and UK brewing industries respectively). The US brewing industry is an oligopoly where the three leading firms, each selling a portfolio of branded and heavily advertised beer products, account for an 83 per cent market share (**Table 1**). Whilst many foreign beers are imported into the US, they take only a 5 per cent market share and appear to be sold at a premium over domestically produced beers. Exports account for only 2 percent of US shipments. This market structure is set in the context of a slowdown in the rate of growth of US beer consumption in the 1980s compared to the 1960s and 1970s (Modern Brewery Age, March 1989).

Since the late-1960s, the UK brewing industry has been dominated by six firms whose combined market share is 76 per cent (**Table 1**). Again setting this in the context of demand for beer, UK consumption rates as a whole have been declining/stagnating in the 1980s (Monopolies and Mergers Commission, 1989). However, within this static demand there has been an important structural change: at the start of the 1970s, UK beer consumption was dominated by traditional ale products, which are often locally brewed and marketed. Since then there has been a marked shift to the consumption of lager, a type

of beer similar to that consumed in the US, which tends to be brewed and marketed nationally by the major UK brewers. Consumption of lager increased from about 6 per cent of total beer consumption in 1970 to 44 per cent in 1987 (Monopolies and Mergers Commission, 1989), and since 1970, 340 different lager brands have been introduced into the market (Financial Times, January 1990).

Table 1 : Domestic Market Shares of US and UK Brewers, 1989, %

US		UK	
Anheuser Busch	- 42.0	Bass	- 22.0
Miller	- 22.0	Allied Lyons	- 13.0
Coors/Stroh	- 19.0	Whitbread	- 11.0
Others	- 12.0	Scottish/ Newcastle	- 11.0
Imports	- 5.0	Courage	- 9.0
		Grand/ Metropolitan	- 9.0
		Others/imports	- 24.0

Source: Modern Brewery Age, March 1989
Monopolies and Mergers Commission, 1989.

With respect to technology, brewing is a long established technique in both countries and there is evidence of economies of scale in beer production (see Elzinga, 1977 and Cockerill, 1984 for evidence on the US and UK respectively). There is also evidence that US plants tend to be both larger and more efficiently utilised than those in the UK (see Cockerill, 1984). The critical point about the technology, though, is that whilst it is not particularly sophisticated, different brands of beer are produced, or at least perceived to be produced to different "recipes", e.g. "Budweiser" is "beech-wood aged", "Strohs" is "fire-brewed".

Given this background, it is important to note that the structural shift in demand for beer in the UK has coincided with the large UK firms acquiring licences to produce and market foreign lager brands. For example, Whitbread brew "Heineken" (Dutch) and "Stella Artois" (Belgian), whilst Courage, prior to their acquisition by Elders, brewed "Fosters" (Australian) under licence, and now they brew "Miller Lite" under licence. The licence to brew "Budweiser" is owned by Grand Metropolitan. It would seem therefore, at least by implication, that some firms find it more profitable to acquire new brands through licensing and may have done so in response to their competitors' strategies.

However, this would explain only one side of any licensing equilibrium. In this respect two additional aspects of the structure of the UK brewing sector need to be noted: **first**, not only do the leading brewers own many brands, they also spend large sums on brand promotion, for example in 1989, Whitbread spent £11 million (\approx \$17.5 million) on advertising "Heineken" alone (Monopolies and Mergers Commission, 1989). This suggests a strong degree of pre-committment on the part of incumbent firms, which is clearly visible to potential entrants. **Second**, the leading UK brewers, unlike their US counterparts, are highly vertically integrated into beer retailing. The top six firms own over 50 per cent of the licensed "pub" outlets, which are tied to selling their owners' products. They also own a large proportion of the "off-licence" retail outlets.¹ Consequently, firms entering the UK market would have problems securing distribution.

In this context, the 1989 Monopolies and Mergers Commission investigation into the UK brewing industry described it as a "complex monopoly" and indicated that the tie between brewers and retail outlets should be substantially scaled down. However, this has

¹Stores where sales are for off-premises consumption.

not as yet been implemented. Therefore, it would appear that direct entry, except by acquisition, would be difficult for US firms and as a result they are attempting to extract rents from imperfectly competitive UK brewers by means of brand licensing. It should be noted that entry by acquisition has occurred in the UK; Elders having acquired Courage from Imperial Tobacco in 1986. However, this appears only to be a viable strategy if conglomerate firms choose to divest themselves of their brewing assets (Financial Times, December 1989).

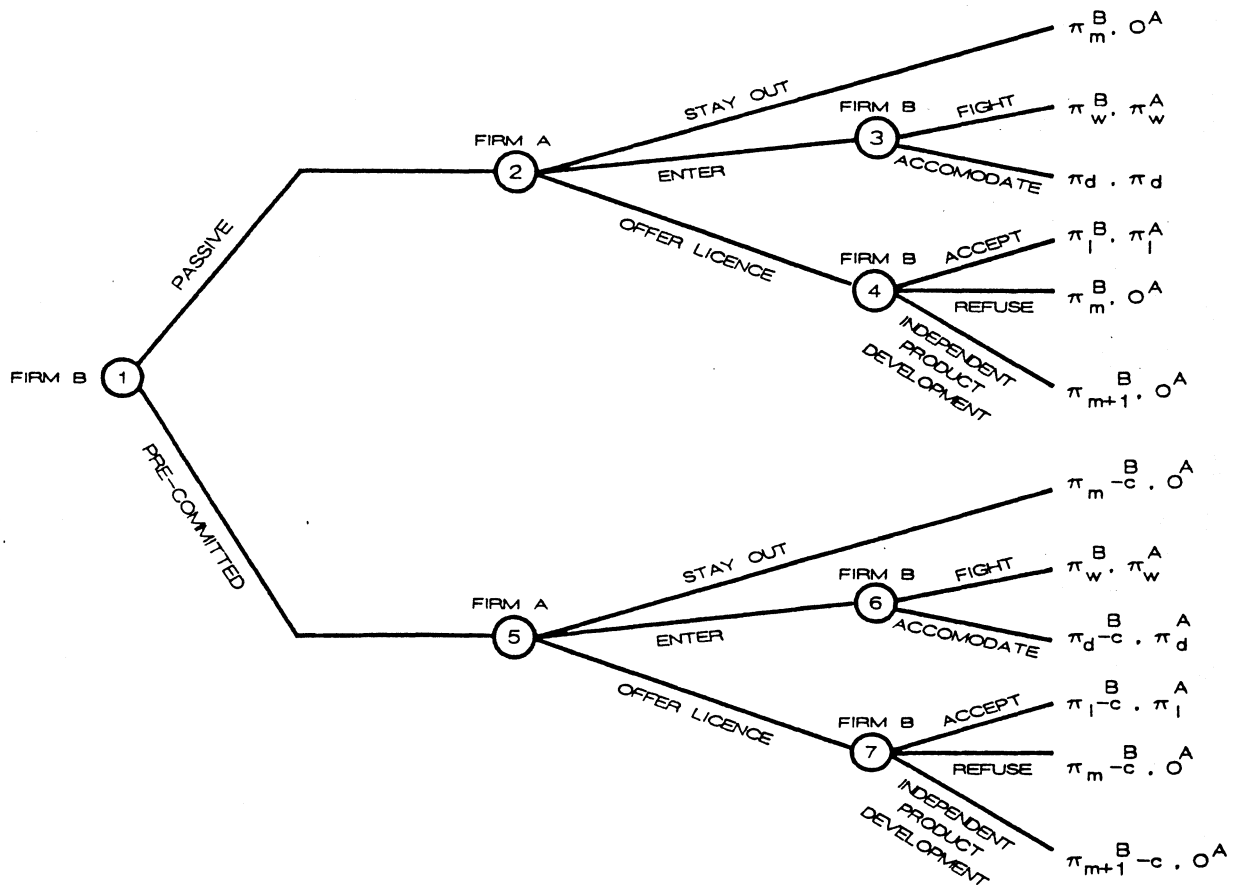
2. Product Licensing Equilibrium

In light of the above discussion, it is useful to consider brand licensing in a theoretical framework. The following licensing equilibrium, based on a stylised market, is modelled in the context of a simple entry game where product licensing enters explicitly into the strategy space of both a potential licensor and licensee (see Gallini, 1984, and Katz and Shapiro, 1985, for applications to technology licensing). Initially it is assumed that the former, firm A, is a monopoly in its own market, producing and selling a single branded food product which it may decide to license in an overseas market. The licence is essentially the right to produce the branded product, for which the licensor has property rights. It also includes basic information on how to produce the product, i.e. the "recipe"; the production technology being treated as relatively unsophisticated.

The potential licensee, firm B, is also a monopoly in its own market, selling a branded product which is differentiated from that sold by firm A. Both firms are assumed to have the same cost structures. However, if firm B adds a second product to its portfolio, its unit costs of production are assumed to fall due to economies of scope. Implicitly, consumers in both markets have an aggregate demand for variety, although this is not modelled here.

The licensing decision by firms A and B is examined in terms of a simple game where licensing is an alternative strategy to direct entry by the licensor and an alternative to independent product development by the incumbent firm. The **extensive** form of the game is depicted in Figure 1, where firms move sequentially left to right. Initially, it is assumed that the game is only played once and the payoffs to any particular strategy are known to both firms. The equilibrium concept invoked is that of Perfect Nash Equilibrium (Selten, 1975). This rules out non-credible threats by firms in the sense that one firm will attach no credibility to an action threatened by another firm for which it has no *ex post* incentive.

Figure 1 Entry/Licensing Game



Equilibrium 1

In this version of the game, the focus is on **node 2** of the game, where firm A moves first.

Analysing the entry/no entry sub-game, the following condition is assumed to hold:

$$\pi_m^B > \pi_d^B > 0 > \pi_w^B \quad (1)$$

The outcome of such a game is well-known (see Dixit, 1982); fighting entry by Firm A is not a **credible threat** by firm B as the profits from sharing the market in a Nash equilibrium, π_d^B , are greater than those from fighting, π_w^B . Hence the perfect equilibrium is that of entry by firm A and accomodation by firm B.

Focussing now on the strategy of offering a licence at **node 2**, for this to be an equilibrium strategy for firm A, it must also be an equilibrium for firm B to accept a licence at **node 4**. Clearly, if the following condition holds, firm B will be willing to accept the offer of a licence:

$$\pi_1^B > \pi_{m+1}^B > \pi_m^B > \pi_d^B \quad (2)$$

i.e. it is more profitable for the incumbent firm to accept a licence, π_1^B , than either developing its own product, π_{m+1} , acting as a monopolist, or sharing the market. If condition 2 holds, then offering a licence will be an equilibrium strategy for firm A if the following holds:

$$\pi_1^A > \pi_d^A \quad (3)$$

where π_1^A are the licensing profits earned by firm A. Assuming (3) holds, (2) must hold, otherwise firm A will simply not offer the licence and will enter the market. It can also be noted that if some informational asymmetry is introduced, i.e. firm A does not know the payoffs to firm B from either accepting or refusing the licence, then it will always be rational for firm A to follow a strategy of direct entry.

Equilibrium 2

Critical to the above equilibrium is the move sequence in the game, i.e. firm A has been allowed first-mover advantage. However, it is possible to allow firm B such an advantage in the sense that it can make irrevocable prior commitments, incurring a sunk cost c , in preparation to fight direct entry by firm A. In the context of branded products, Salop (1979) has suggested that product differentiation and advertising represent examples of such prior commitments.

Therefore, at **node 1** of the game, pre-commitment is a rational strategy for firm B if it is optimal to fight entry i.e:

$$\pi_w^B > \pi_d^B - c \quad (4)$$

Assuming firm A can observe this, it will not enter if firm B is pre-committed, but will do if firm B is passive. Firm B, in turn, will pre-commit if the monopoly profits from doing so exceed the profits from passive market sharing:

$$\pi_m^B - c > \pi_d^B \quad (5)$$

Therefore, as long as there is a pre-commitment whose cost satisfies the following condition:

$$\pi_m^B - \pi_d^B > c > \pi_d^B - \pi_w^B \quad (6)$$

then a credible threat can be employed by firm B such that at **node 5** of the game, entry is no longer an optimal strategy for firm A, i.e. it knows firm B will fight to protect its pre-commitment.

It is now the case that, at **node 7** of the game, both licensing $(\pi_1^B - c)$ and developing a new product $(\pi_{m+1}^B - c)$ are possible outcomes and hence strategies for firm B. Licensing will be an equilibrium if the following conditions hold:

$$(\pi_1^B - c) > (\pi_{m+1}^B - c) > (\pi_m^B - c) \quad (7)$$

$$\pi_1^A > 0 \quad (8)$$

Therefore, in this simple model, the motives for licensing are clear: the licensor aims to extract rents from an imperfectly competitive market overseas that it is unable to enter directly, whilst the licensee aims to increase monopoly profits via a less costly route than independent product development. However, this model has been constructed using certain simplifying assumptions which need to be relaxed, specifically a monopolistic structure in firm B's market, and perfect information on the part of firm A about all of firm B's payoffs.

Relaxation of Assumptions

If it is assumed that firm B operates in a small numbers, non-cooperative oligopoly, then the outcomes of the two games outlined above will not change substantively, although the incentive structure for the incumbent firms may change due to their strategic interaction. In the case of **equilibrium 1**, direct entry by firm A is again likely to be the dominant outcome of the game, i.e. the following condition holds:

$$\pi_o^A > \pi_1^A \quad (9)$$

where π_o^A are the oligopoly profits accruing to firm A. However, it is important to note that the necessary condition for an incumbent firm, say firm B, to accept a licence will now be affected by its conjectures about other firms' licensing decisions, i.e. even if independent product development is more profitable than licensing, it may desire to pre-empt its rivals from obtaining the licence because the loss of future profits from not licensing exceeds the difference between independent product development and purchasing the licence:

$$\pi_o^B - \pi_o^{B'} > \pi_{o+1}^B - \pi_1^B \quad (10)$$

where $\pi_o^{B'}$ are firm B's oligopoly profits if another firm gets a licence and π_{o+1}^B are the profits to firm B of independent product development.

Even if (10) is satisfied, it is not sufficient to ensure a licensing equilibrium. In an auction, firm B will only bid up to what it will lose if another firm gains a licence, whilst firm A's reservation price will be at least π_o^A , the oligopoly profits it could gain through entry. Hence the necessary condition for a licensing equilibrium in this case is:

$$\pi_o^B - \pi_o^{B'} > \pi_o^A \quad (11)$$

i.e. the amount bid for the licence must exceed firm A's oligopoly profits if it chooses to enter.

This seems a particularly strong condition for a licensing equilibrium, hence entry is likely to occur. Turning to **equilibrium 2**, where entry is credibly prevented by the incumbent firms, the licensing equilibrium is now only dependent on it being profitable for both firm A and firm B. However, as just noted, pre-emptive behaviour by the incumbent firms now enters the equilibrium. This strategic interaction between firm B and its rivals would seem *a priori* to make licensing a more likely outcome in oligopolistic markets than monopolies.

Retaining a market structure of monopoly for firm B, the assumption of perfect information on the part of firm A about the payoffs to firm B can also be relaxed. The focus is on a situation where firm A cannot observe the level of pre-commitment by firm B, and is therefore uncertain about whether firm B will fight entry. However, the game as structured can now be repeated a finite number of times such that firm A can follow a particular strategy, observe firm B's response, and then update beliefs in a Bayesian manner. The equilibrium concept employed here is that of Sequential Equilibrium (see, Kreps and Wilson, 1982), and such a framework now allows for reputation building behaviour by firm B. The intuition of the equilibrium is as follows: a committed firm will always fight entry, as sharing the market will indicate a lack of commitment. However, a

passive incumbent may act aggressively in order to be mistaken for a committed firm. Observing this, the entrant will update his prior beliefs about the incumbent firm and may choose to exit the market. In the stylised market described above, firm A is treated as the only potential entrant who, before entry, has the prior probability p of facing a committed firm B. If the following condition is true at the first play of the game, firm A will not enter:

$$p\pi_w^A + (1 - p)\pi_d^A < 0 \quad (12)$$

If (12) is greater than zero at the first play of the game, firm A will enter, however if it is met with aggression by firm B and upon revision of its beliefs (12) becomes negative, firm A may exit at the second play of the game. Therefore, with imperfect information, firm A may adopt licensing as its optimal strategy.

Extending this, it may be the case that firm A believes that licensing is a means of revealing information about firm B. For example, a licence may be offered at the first play of the game and refused, but at this stage it is not clear for what reasons it is being refused. However, failure by firm B to develop a new product will possibly reveal that it is an uncommitted incumbent and is simply attempting to delay entry by firm A. Hence, an uncommitted incumbent will rationally accept a licence for the same reason that it will fight entry, i.e. building some sort of reputation. Of course a committed incumbent will also accept the offer of a licence, even if it is less profitable than independent product development, as it does not want to be mistaken for an uncommitted firm. Therefore, imperfect information about firm B and strategic behaviour by firm B may lead to a licensing equilibrium.

3. Summary

In summary, this paper has suggested that the licensing of branded food and related products may become an increasingly important feature of international transactions in the food industry. Specifically, in focussing on the characteristics of licensing in the brewing industry, some initial analysis indicates that effectively barricaded entry into the UK market and the expense of independent product development has led leading US firms to licence their brands to UK brewers, the aim being to capture rents in the expanding UK lager market.

Currently, the economic theory of licensing deals predominantly with the transfer of process technology rather than branded products. Therefore, given the observations on food brand licensing, a conceptual model of a product licensing equilibrium has been presented in order to provide an analytical background to more rigorous empirical work. This analysis suggests that if licensing is considered as an alternative strategy to entry in a simple game-theoretic structure, then in the simplest type of model, licensing is aimed at extracting rents from imperfectly competitive overseas markets. In a more complex model strategic interaction amongst incumbent firms and imperfect information about their payoffs may also be important factors in the decision to license products internationally.

Clearly more research needs to be conducted in this area both in developing the theory and in establishing the quantitative importance of licensing and its determinants. Also, other licensing issues not addressed in this paper include the notion of an optimal licensing contract, the process of bargaining, the content of brand licensing agreements, and the lifespan of licences.

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